DOE/EH - 0265

Report from the DOE Voluntary Protection Program Onsite Review, May 22-24, 2001

U.S. Department of Energy
Office of Environment, Safety and Health
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Contents

Abbreviations and Acronyms

ALARA	as low as reasonably achievable committee
ATS	automated tracking system
BED	building emergency director
BLS	U. S. Department of Labor's Bureau of labor Statistics
CAIRS	DOE computerized accident/incident reporting system
CATS	corrective action tracking system
CHPs	certified health physicists
CIHs	certified industrial hygienist
CSPs	certified safety professional
CWA	construction work authorizations
DOE	United States Department of Energy
DOE-RL	U.S. Department of Energy's Richland Operations Office
EJTA	electronic job task analysis
EP	emergency preparedness
EPR	electronic preparation and risk
ES&H	environment, safety, and health
ESR	electronic service request
FTRIB	facility training review and implementation board
HAMTC	Hanford Atomic Metals Trade Council
HFD	Hanford fire department
IESH	integrated environment, safety, and health
IOPS	integrated operation system
ISM	Integrated Safety Management
JSA	job safety analysis
MSDS	material safety data sheet
OSHA	U.S. Department of Labor's occupational safety and Health Administration
PAAA	Price-Anderson Amendments Act
PdM	predictive maintenance
PE	professional engineer
PPE	personal protective equipment
PM	preventive maintenance
PNNL	Pacific Northwest National Laboratory
R&D	research and development
R2A2	roles, responsibilities, accountabilities, and authorities
RWP	radiation work permits
S&H	safety and health

SBMS	standards-based management system
SHIMS	safety and health information management system
SIC	standard industry code
SWP	safety work permits
UDAC	uniform dose assessment center
VPP	Voluntary Protection Program

Executive Summary

The DOE-VPP onsite review of the Pacific Northwest National Laboratory (PNNL) was conducted from May 22-24, 2001 in Richland, Washington. Battelle has operated Pacific Northwest National Laboratory for the Department of Energy (DOE) and its predecessors since 1965. The following summarizes the review teams observations and analysis.

Management Leadership

The DOE-VPP Onsite Review Team (Team) found strong evidence of safety and health (S&H) commitment from all levels of management. Management and employees have successfully established a relationship of mutual respect and cooperation on all matters relating to safety program implementation. The Team noted that management demonstrated a very strong commitment to employee S&H and they held themselves both responsible and accountable for S&H in the workplace. All managers, supervisors and employees are evaluated as to their performance in the safety and health area. Top-level management is visible and actively participates in the S&H program.

Employee Involvement

The Team found that employees are actively involved in S&H in the workplace. Employee involvement not only occurs through their participation in the safety meetings and training activities, but also through the safety inspection processes, the worker observation program, and in periodic self-assessments. Employees openly stated that they not only felt responsible for their own safety, but also for their peers' safety. The Team found during the interviews that employees usually spoke in terms “our” efforts when referring to their peers and management. This clearly demonstrates a strong sense of ownership and pride in S&H by the employees. The Team observed that employees are truly involved in the S&H program and a strong safety “culture” has developed at this site. Notably, employees are not only involved in hazard recognition, job hazard analyses, but also in hazard resolution.

Worksite Analyses

Various forms of self-inspections are conducted at this site. Job hazard analyses are thorough and extensively utilized. Employees are not only encouraged to report any unsafe conditions, but are expected to report and correct the situation(s), if safe to do so. Accident investigation processes involve employees and result in an analysis to determine the root cause. Identified hazards are immediately addressed with appropriate corrective actions are being taken in a timely manner. The site has established several integrated hazard analysis and work planning tools. PNNL also conducts numerous inspections of all units and areas such that the entire worksite is covered at least quarterly.

Hazard Prevention and Control

PNNL has a full complement of safety and health professional staff. Safety and health rules have been clearly laid out for all employees and managers. The site employs a standard hierarchy of control to the prevention and mitigation of hazards in the work environment consisting of engineering controls, administrative controls, and personal protective equipment (PPE). The PPE program is an in-depth program that is well integrated into the operations control, safety and health oversight, and training portions of the site's programs. PNNL has implemented a comprehensive preventive maintenance (PM) program that uses a combination of preventive, predictive, and corrective maintenance to enhance the availability, operability, and reliability of plant structures, systems and components. The site has mature, well functioning emergency preparedness, radiation protection and medical programs.

Safety and Health Training

The Team noted from employee interviews and document reviews that employees at all levels knew how to identify and protect themselves and others from hazards associated with their jobs. As was noted on several occasions during the interviews, the training provided to employees has made them more conscious of health and safety issues not only in their work environment, but also in their everyday lives away from the site.

Management clearly supports the S&H training programs as evidenced by employee interviews, funding levels, documentation review, accreditation, and nationally recognized awards. In addition, interviews with personnel, who conduct safety and health inspections and self-assessments, confirm that they provided in-depth hazard recognition training.

Conclusion

The Team concludes that the applicant has met and/or exceeded each of the five DOE-VPP tenets. Accordingly, our technical opinion as documented in this report will be presented to the DOE-VPP Program Administrator for consideration.

I. Introduction

The DOE-VPP onsite review of the Pacific Northwest National Laboratory (PNNL) was conducted from May 22-24, 2001 in Richland, Washington. Battelle has operated Pacific Northwest National Laboratory for the Department of Energy (DOE) and its predecessors since 1965. This application encompasses all work conducted by PNNL regardless of the sponsoring organization. Availability of electronic references in the application provided an abundance of records and information. The electronic links within the application provided easy access to information. The application was approved on May 4, 2001.

DOE's Office of Science and Technology manage PNNL, but it performs for a number of other government agencies and private sector clients. According to Laboratory's Web Page, PNNL's core mission is to deliver environmental science and technology in the service of the nation and humanity. Through basic research they create fundamental knowledge of natural, engineered, and social systems that is the basis for both effective environmental technology and sound public policy. They solve legacy environmental problems by delivering technologies that remedy existing environmental hazards, they address today's environmental needs with technologies that prevent pollution and minimize waste, and we are laying the technical foundation for tomorrow's inherently clean energy and industrial processes. They also apply their capabilities to meet selected national security, energy, and human health needs; strengthen the U.S. economy; and support the education of future scientists and engineers.

PNNL provides essential support to the Hanford Site, locale of the U.S. Department of Energy's Richland Operations Office (DOE-RL) and is a major national asset. In the area of science and technology PNNL is designated as a Principle Laboratory for the Environmental Quality mission in the DOE Strategic Laboratory Mission Plan. They also make significant contribution to DOE's other missions with our energy, national security, and health work. PNNL intend to be a benchmark of excellence for laboratory management, thus providing DOE and the nation with the greatest possible research value while fully meeting their responsibilities for the safety and health for their workers and the public, and for protecting the environment.

PNNL was evaluated against the program requirements of the U.S. Department of Energy Voluntary Protection Program (DOE-VPP). The On-site DOE-VPP Evaluation Team consisted of a diverse cross section of individuals from the DOE Headquarters office and the Richland Operations Office. See Appendix for a roster of the DOE Onsite Review Team. During the review, the Onsite Evaluation conducted formal and informal interviews, and reviewed limited documentation.

II. Injury and Illness Data Assessment

The Standard Industry Code (SIC) for PNNL IS #873, Research and Development. The injury/illness rates reported by Battelle show that they are below the known rates for comparable industries. Submitted rates meet the DOE-VPP criteria. The listed data was collected from the DOE Computerized Accident /Incident Reporting System (CAIRS), and the Bureau Labor Statistics (BLS).

Historical Occupational Injury and Illness Data PNNL Employees (Only)					
Calendar Year	**Hours Worked**	**Total Recordable Cases**	**Total Recordable Case Incidence Rate**	**# of Lost and Restricted Workday Cases**	**Lost and Restricted Workday Case Incidence Rate**
1998	6,324,022	72	2.28	31	0.98
1999	6,586,835	55	1.67	25	0.76
2000	6,569,482	70	2.13	35	1.07
1998-2000	**19,480,339**	**197**	**2.02**	**91**	**0.93**
	Total hours	***Total cases***	***3-yr Average***	***Total cases***	***3-yr Average***
Historical Occupational Injury and Illness Data PNNL Subcontractors (Only)					
1998	145,787	4	5.49	1	1.37
1999	86,897	2	4.60	1	2.30
2000	80,774	4	9.90	3	7.43
1998-2000	**313,458**	**10**	**6.38**	**5**	**3.19**
	Total hours	***Total cases***	***3-yr Average***	***Total cases***	***3-yr Average***
Historical Occupational Injury and Illness Data PNNL Total (including subcontractors)					
1998	6,469,809	76	2.35	32	0.99
1999	6,673,732	57	1.71	26	0.78
2000	6,650,256	74	2.23	38	1.14
1998-2000	**19,793,797**	**207**	**2.09**	**96**	**0.97**
	Total hours	***Total cases***	***3-yr Average***	***Total cases***	***3-yr Average***
1999 Bureau of Labor Statistics rates for SIC 873			***2.6***		***1.0***
"Research development and testing services"					

PNNL made their comparisons with data from Bureau of Labor Statistics (BLS) information. (Applicants are required to compare their injury/illness data with the 3-year average rate to the most current published Bureau of Labor Statistics (BLS) injury rates for that industry).

As self-identified in their application, the majority of recordable injuries and lost workdays in recent years have been ergonomic injuries. This increase is apparently due

to the increased use of computers and heightened awareness of ergonomic issues within PNNL.

PNNL operates the main laboratory facility at the Hanford Site in Richland Washington and in ancillary locations throughout the world. At any one-time, one-fifth of their work force may be on travel anywhere in the world. PNNL is proactive in taking responsibility for the safety and health of its staff members wherever they are working for the laboratory regardless of location. Management insists that traveling workers must be ambassadors for safety, capable of recognizing hazards and helping other organizations correct problems before injuries occur.

The Safety Specialists are responsible for the entries to the OSHA 200 Logs and verifies the accuracy of the records. There are at least three reviews made to determine the record ability of an injury or illness. It was determined the two Safety Specialist understands and is knowledgeable of the process. Based on interviews it was determined that the records and logs reflect the experience at PNNL.

PNNL requires contract employers to maintain joint logs. There are approximately 300 to 500 different subcontractor employees at the site over any one-year. Injury or illness occurring to temporary employees under the direct supervision of PNNL would be recorded on the work site's OSHA 200 Log.

As self–identified in their application, the majority of recordable injuries and lost workdays in recent years have been strains, sprains, and ergonomic injuries. Many can be accountable to the increased use of computers. It was felt since so many people are on travel during the course of a year that vehicle and travel related accidents are the highest area of risk.

NOTABLE: PNNL provides no incentives, rewards, or special recognition to keep rates of injury/accident/illness low.

III. Management Commitment

The level of management commitment found at this site meets all DOE-VPP criteria. The sub-elements of this tenet and an evaluation of the applicant's performance in these areas are addressed and described below.

VPP Commitment

Management support and commitment are critical to the successful implementation of the DOE-VPP. PNNL management has implemented a number of well-integrated Standards-Based Management Systems (SBMS). These systems work together to ensure that all work is managed, and all recognized potentially hazardous situations are identified and mitigated.

PNNL Laboratory Policies state that "We are committed to providing a safe and healthy working environment for all staff; protecting the general public, and the environment from unacceptable environmental, safety and health risks; and operating in a manner that protects and restores the environment." Anything that poses a safety and health risk is unacceptable. During the review employees indicated they were aware of this position.

PNNL managers at every level are involved and showing their commitment to worker safety by helping to identify the worksite hazards and reduce the danger of injury and illness to employees. An Integrated Environment, Safety and Health (IESH) management system is in place that supports efforts efficiently and effectively accomplishes work while protecting the workers, the public, and the environment.

Management's involvement, participation, and visibility in safety are evidenced by their endorsement of staff members and worker's participation workplace safety activities. Activities include participation in safety councils, critiques of events, and work planning.

All staff employees and management have performance criteria that include safety performance as a key element of their yearly evaluation. All employees at PNNL may report a safety related concern or issue without fear of reprisal or harassment for reporting the issue. Bargaining unit employees do not have performance criteria.

The VPP Steering Committee is co-chaired by two staff members: one from the bargaining unit (crafts), and the other from the non-bargaining unit under the research and development side of PNNL. A cross section of workers encouraged PNNL to pursue VPP flagged status in 1996, and management endorsed and supported the program in 1997. The application reports continual safety program improvement since beginning the journey to VPP Star Status.

Leadership

The application presents a well thought out comprehensive program to support all the sub-elements of this VPP tenet. Management commitment to safety and employee involvement is implicit in the design of the program and systems that support safety at the site.

The Director and managers solidly demonstrate management commitment. PNNL's commitment is demonstrated in strong safety and health policy statements, the providing of resources necessary to support all safety and health program activities, attention to employee identified safety and health concerns, active participation in safety promotional activities, and leadership/mentoring for employee safety team activities.

PNNL has established a hierarchy of committees and teams that appear to effectively provide an opportunity for all employees to be involved in the safety program. Starting with the VPP coordinating committee, and working down through several process and discipline specific committees, workers and managers cooperate to plan and administer the safety process.

PNNL has three different and distinct operations, these are: Research and Development, General Office, and Operational Maintenance. The total workforce is approximately 3600 employees. A small development group of about 100 employees work in marine biology and is located in Sequim, Washington.

Organization

PNNL is organized to support its "Customer Service Model" and Roles and Responsibilities policies. Through review and observation of the processes in action, the review Team believes that safety is well integrated into PNNL's organizational design. The Laboratory is organized into four research and development divisions (each with a specific mission area) and various support organizations (directorates) that provide expert assistance to the research and development missions. The ES&H Directorate reports to the Laboratory Director and provides expert ES&H services to the Laboratory. Most of the staff in the ES&H Directorate (including the Safety and Health Department and the Radiological Control Group) is assigned to support specific line organizations, facilities, and/or programmatic functions. Those staff (sometimes referred to as Subject Matter Experts) provides direct support to their line organization customers and frequently participates as team members on specific projects or work activities.

Responsibility

Top management is prominently involved in all elements the safety and health program, and they are committed to the implementation of a well-coordinated S&H program, including establishing a clear line of communication with employees. PNNL subscribes to the philosophy that line management is responsible for safety. However, it is clear that management needs help with implementing the Environment, Safety and Health (ES&H)

Program, that each staff member is personally responsible for safety and has a significant role to play in implementing this program.

PNNL has clearly defined the roles, responsibilities, accountabilities, and authorities (R2A2s) for conducting business. Managers and staff have been clearly made responsible for safety at PNNL. Policy acknowledges that a team of ES&H specialists with technical expertise, including a variety of disciplines such as industrial hygiene, fire protection, and radiation protection must be available to achieve excellent performance. For that reason, highly qualified ES&H professionals are part of the operating teams that ensure that work is performed safely, and other ES&H professionals provide independent overview of PNNL operations. Each organization performing potentially hazardous work has "field-deployed" ES&H staff assigned to support operations.

PNNL uses position descriptions to ensure that all positions in their organizations have a current and accurate description of the duties of the job to be performed and the reporting relationship Standards Based Management System subject area, Recruiting and Hiring. The Position Description Form found in this subject area addresses the responsibilities and accountabilities of the job to be performed. Staff performance review is used to monitor and reinforce implementation and performance goals for safety.

PNNL has established a strong safety culture; that both management and employees share a belief that all employees of PNNL are both responsible and accountable for safety and health in the workplace. On some cases or occasions, employees and management and other workers have had some issues related to differences on safety and health issues. Reviews have indicated that most of the problems were jurisdictional between the crafts. In general, these issues had no direct reflection on safety of the work.

NOTABLE: As identified in PNNL's self-evaluation for CY2001, they identified a problem relating to communication between management and employees were not as effective as could have been. To correct the problem, they have set up a program to assure "closure" is provided on pre-jobs, issues, and concerns. Management and employees are being reminded to always seek closure before ending action.

Accountability

Management is committed to providing the leadership, direction, goals, training, resources, and standards to assist employees in the performance of their duties in a safe and healthful manner. Management and employees share in the responsibility to carry out individual duties in a safe manner. Managers are held accountable for safety by specific standards within their individual performance standards and they are accountable for the consistent enforcement of company safety policy. The company has a formal written performance appraisal system with safety and health responsibilities as a critical element for management personnel.

The annual performance reviews are a key method used by the site to hold all employees, including managers and supervisors, accountable for their performance. The annual

performance reviews, which are conducted for all employees, consider safety and health performance as a major element of the review. Employees have input to what their specific safety and health expectations are for the rating period. Additionally, the results of these reviews directly affect annual merit pay considerations. Management has an established policy allowing disciplinary action(s) for violations of rules, policy and requirements, thereby ensuring day-to-day accountability on the job. Accountability is regularly communicated to all employees through staff meetings, safety meetings, training, site publications and annual performance reviews. All subcontractors are expected to follow PNNL safety and health requirements, and they are held accountable for meeting these requirements, both through formal contractual agreements, and through the implementation of formal policies, procedures, and directions. Failure to comply with these requirements and/or continued non-compliance can result in dismissal from the work site.

Authority and Resources

All employees are responsible for safety. All site employees are empowered by management with the authority to address safety concerns. This review indicated that the system utilized is effectively working. The Director has the ultimate responsibility with the assistance of full-time professional, technical and administrative employees, and the various safety teams. Adequate resources, including staff, equipment, materials, and funding, training and professional expertise have been committed to workplace safety and health.

PNNL changed their management system in 1996 to a safety & health related Standard Based Management System (SBMS). This in-turn, changed many aspects of safety and health projects, investments, training, and funding processes. This system of standards based management places emphasis on safety and health, work site analysis, hazard identification and prevention/control, and management and staff related assessments. The resources in dollars amount to approximately 4% of the PNNL.

A couple of staff members indicate that in the past, unclear guidance from technical staff on safety and health issues has occurred. When this occurred, the “stop work authority” was invoked.

The ability to invoke the use of “stop work authority” has been clearly communicated to the entire staff, along with the understanding that any perceived repercussions will not be tolerated.

NOTE: PNNL’s current work process does not record an explanation of the specific reason behind the “stop work” and attach or flag this explanation to the work package, making it’s correction a requirement prior to reissue or restart. Accomplishment of this action would further develop an accountability of actions, assist the lessons learned program (proactive action can develop), and enhance PNNL’s creditability.

Most staff indicated that attendance at conferences and maintaining any certifications has not been a problem. PNNL management highly supports attendance at conferences, meetings, and development activities.

Corrective actions on findings, issues, and other items are tracked until completion on the Automated Tracking System (ATS). This includes many VPP items.

PNNL has an active training program. Most training provided is Web-based, but is available on hands on instruction if the employee so desires.

The previous budgets have been more than adequate. However, it is uncertain what will be in store for the FY 2002 and 2003 budget. Some cuts are anticipated.

Planning

The need to build S&H into projects is well ingrained in PNNL culture and policy. The annual planning process requires managers to analyze and predict employee training, ES&H, and operational costs for doing business. A five-year institutional plan helps capture long-term goals and capital expenditures. An integrated planning framework has been established to provide a comprehensive template to ensure the planning process in comprehensive. The Integrated ES&H management system and Integrated ES&H program description within the SBMS outline how work is proposed, planned, and executed at the Laboratory. The work process at the Laboratory integrates safety and health into the project life cycle.

The inclusion of safety and health planning by management begins at the company or site level. The first guiding principle in the site's long-range Plan, which governs the site's mission and vision, is "environment, safety and health excellence." At lower levels, managers of programs and projects are required to plan and outline safety and health support as part of their program or project scope of work. Overall, the application indicates that the safety and health program is goal driven with annual review and modification of goals and objectives based on actual performance findings. Safety and health planning is extremely thorough, and it is designed to ensure continuous improvement.

NOTABLE: It was confirmed that PNNL develops annual environment, safety and health management plans as part of the annual, site-wide budget process. These ES&H documents and plans support the overall budget process, identify crosscutting issues and needs, and document projected activities for ES&H.

Subcontractor Program

Contract workers are expected to meet the same standards for safety as PNNL staff. Contractors or their workers who do not meet those standards may be barred from performing work at PNNL. No recent examples could be found, however, personnel in PNNL Contracts indicated action to not permit sub contractors to work at the lab would be upheld.

PNNL oversees its contractors through its contract staff. The SBMS subject area, Purchasing Goods and Services, provides the Laboratory-level requirements for establishing a contract, and the Special Requirements exhibit within this subject area states that "procurement requisitions must address ES&H (Environment, Safety and Health) considerations."

The ES&H Contract Clause is inserted into subcontracts as appropriate. Subcontractors are then carefully screened using combined ISM/VPP criteria. Those accepted for work at the site must send their employees to the required site-entry training courses before beginning work. Once on-site, subcontractors are closely monitored through weekly and monthly surveillance to ensure compliance with site policy, standards, and regulations. Deficiencies must be corrected in a timely manner, and employees cannot be exposed to hazards during mitigation activities. Failure to comply with safety and health rules, regulations, and policy can result in monetary penalties and/or dismissal from the site. Subcontractors who repeatedly violate the same rules, policies or standards may be dismissed from the site and prohibited from bidding on future work at the site.

PNNL has several different forms of subcontracted work. These are activities or work from other onsite Hanford Contractors (DynCorp, Fluor Federal Services, Hanford Environmental Health Foundation, etc.), subcontracted from the community, National solicited, Foreign countries, Universities, etc. PNNL requires all contractors and subcontractors to undergo review and meet safety and health program requirements. This is a major part of awards selection and permission to work at PNNL.

All Subcontracted work employees must receive the primary site orientation through HGET; activity and workplace specific orientation and training is received through a mix of both site-sponsored courses and contractor-sponsored courses. Contract provisions require program and site audits by PNNL. Contracted entry/exit at the site is through a series of security and permit/work authorization processes. Contracts contain penalties (e.g., stop work without remuneration for safety infractions), up to termination for non-compliance. This system has been effective for several years.

The management personnel interviewed during the course of this onsite evaluation who had a responsibility for either planning, supervising, or working along with subcontractors indicated that subcontractors were all expected to follow PNNL S&H requirements, and that subcontractors were held accountable for meeting these requirements. In addition, a few random interviews with subcontractor employees confirmed that subcontractors and their employees were held accountable for S&H performance on the job. These subcontractor employees all appeared to be knowledgeable in the site's safety requirements and actively participated in the site's VPP activities.

Program Evaluation

Annual program evaluations have been conducted using VPP criteria since 1997. Evaluations of the S&H program are conducted with participation by both management and employees. Self-assessments and annual reviews are used as a means for continuous improvements in the S&H program.

The results of annual program evaluations and other S&H trending data are used by each of the 11 VPP units within the site to develop goals and objectives for the coming year. Employees conduct the annual evaluations, and the results are formally documented. Every corrective action is then tracked to completion. Yearly goals and objectives for the overall site S&H program and the individual units are developed and partially based on the results/findings of the annual program evaluations.

The last annual VPP program review was completed in March of 2001. The report was well documented, identified areas needing improvement, and included detailed corrective actions and goals to ensure the VPP effort and overall program is continuously improved at this site. The evaluation for CY 2001 indicated a lack of effective communication between employees and management. A time line has been set-up and should be enhanced in PNNL operations, once implemented in the next two months.

Site Orientation

A comprehensive, formal site orientation program including training and documentation applies to all persons entering this site. The PNNL Orientation modules are available on the Internet. New employees can access the training modules remotely prior to arriving on site. This arrangement is particularly beneficial for visiting scientists and students. Additionally, PNNL has developed the Integrated Operation System (IOPS) to provide job-specific orientation and appropriate training to all individuals, including staff, vendors, consultants, students, and visiting scientists. Each individual is responsible for completing their training matrix before being granted access to IOPS buildings or laboratory spaces. For each visitor, a staff member serving as host assumes responsibility to ensure that all appropriate orientation and training are completed.

Employee Notification

The employee notification program surpasses the requirements for employee notifications contained in DOE Orders and guidance documents, and these requirements exceed the OSHA (Federal and State) requirements for employee notification. The lab employs a number of communication mechanisms designed to appeal to the diverse population. PNNL has established a Voluntary Protection Program (VPP) Web site. In addition, VPP information brochures and postings have been developed and a survey with a significant incentive award was implemented. The survey results indicated that over 99% of staff is aware of PNNL's participation in VPP and over 73% recognized the tenets of VPP.

The Laboratory Director and other personnel in the management structure have clearly accepted responsibility for the safety of their employees and the operations under their

control by establishing Environment, Safety and Health (ES&H) policies. The management of the facility is fully committed to achieving an accident-free work environment.

Management Visibility

Top-level management is clearly visible, and actively participates in S&H program. Laboratory management regularly participates in various S&H activities. Managers are held accountable for their S&H responsibilities, and maintain a policy of accessibility with regard to S&H issues that arise in the workplace. An "open door" policy ensures that any employee at any time can express an S&H concern to any level of management. The team confirmed this policy through formal and informal interviews, and noted that most employees did not feel the need to raise concerns above their first-tier or immediate supervisor, because any concerns raised were resolved almost immediately. Also, all employees VPP Steering Committee and the PNNL-Hanford Atomic Metals Trade Council (HAMTC) Laboratory Safety Committees did an outstanding job of addressing any safety concerns and facilitating corrective action(s) where needed. Accordingly, employees did not believe it necessary to take concerns to upper level management, as issues were handled effectively by the various safety committees and first line supervision.

Conclusion

Management leadership is clearly demonstrated by the S&H infrastructure in place and functioning at this site. Skillful attention to the encouragement and growth of employee ownership has enhanced not only the S&H program, but has measurably improved all operational areas. PNNL meets all requirements for the management commitment tenet.

IV. EMPLOYEE INVOLVEMENT

The onsite review clearly showed that employees are actively engaged in the S&H program. In addition, review of program documents and the results of interviews showed that management has empowered employees to proactively administer the S&H program at this site. The degree of employee involvement in safety and health found during the review clearly meets all DOE-VPP criteria for employee involvement.

Degree and Manner of Involvement

The information gathered for this portion of the report relies heavily on observations of employees in the workplace while conducting their routine duties, and on both formal and informal interviews of employees. The anecdotal information gathered during interviews is often the most informative method of determining whether extensive, complicated methods and procedures are actually utilized, and whether such well-intended programs are genuinely useable and effective for the workers. No review of workplace conditions or programmatic effectiveness can have a high degree of confidence without the gathering and analysis of this type of anecdotal information from the interview of workers. Formal, scheduled interviews are most useful when complimented by random, unscheduled interviews. Random interviews allow reviews to have a greater degree of confidence in the results obtained during formal interviews, they help to exclude any "rehearsed" information and they often result in a frankly candid opinion.

Formal employee interviews at this site were conducted by selecting employees from a list that was provided by PNNL. Additionally, random interviews were obtained by selecting employees during the walk-through of work areas at the various site locations.

Workers were candid and showed no fear in talking with the VPP review Team during interviews. All employees indicated that they understood their rights and responsibilities, and are very knowledgeable about their rights and responsibility regarding safety and health. Interviews confirmed that a strong safety culture exists at all levels, and employees feel empowered to voice safety concerns.

Most employees were familiar with the Lab's efforts to continually improve safety programs. They understood that the pursuit of VPP recognition was part of the Lab's continuing efforts to keep the program moving forward. Some R&D workers were clearly less than fully enthusiastic about some of the safety campaigns and efforts surrounding the VPP rollout. The R&D workers did, however, understand and appreciate management's intent to improve safety. Almost all employees interviewed were very knowledgeable regarding their rights to request reports of inspections; accident investigation; and injury and illness records. All stated that they were given timely and complete written and/or oral feedback to safety and health questions and issues.

Overall, it was clear that the work force has enthusiastically welcomed the opportunity for increased participation in assuring their abilities to perform work safely. When asked how the VPP process has impacted their work, most employees interviewed responded that their awareness level has increased, and their recognition of how their work may impact the safety others has also been heightened. Notably, laboratory employees indicated that the Company's VPP efforts have kept safety in the forefront. Many workers indicated that the VPP effort has moved the Lab's programs to a higher level.

Safety and Health Committees

Employees are knowledgeable about the VPP effort at this site through several committees including:

- PNNL-Hanford Atomic Metals Trade Council (HAMTC) Laboratory Safety Committee
- VPP Steering Committee
- Radiochemical Processing Laboratory Independent Review Committee
- Integrated Operations System Facilities Safety Committees
- Electrical Safety Committee
- Lock and Tag Committee
- As Low As Reasonably Achievable (ALARA) Committee
- Biological Safety Committee

The Lab has also spread the word through the VPP Web page; Posters; emails; bulletin boards; Porcelain Press; safety meetings; all hands meetings; and other oral communication. Employees feel they own the committees, and that management participates in the committees, but the employees have the ownership. The VPP Porcelain Press is another very informative way to communicate to the staff about safety and ways that they are involved in VPP and may not even know it in their every day work tasks.

There are numerous safety-related committees and activities associated with SBMS or IOPS. Most employees remarked that ample opportunities exist for involvement in all aspects of the safety and health program.

Committee meetings are held on a monthly basis, and minutes are kept and posted for review by all employees. Employees are very knowledgeable and confident in the committees and program processes.

Most workers indicated that they have input into the procedures in their work packages. Many of them are involved in the development process and others have input after the development, but always prior to implementation and use. Employees were very confident and enthusiastic and feel they are part of the work development process at this site. PNNL is starting to incorporate more employee involvement in the development of new training, coordinating with other craft, and also in the actual writing of the lesson plan.

Employees are involved in the reporting (formally and informally) of hazards. They have stop work authority and they feel comfortable and confident with it. They have input into systems and procedures for incentive programs as well as the disciplinary procedures as they relate to safety and health issues. PNNL and Hanford Atomic Metal Trades Council has assigned a (HAMTC) Bargaining unit Safety Rep. who is responsible for assisting bargaining unit staff members with resolving their safety related concerns, or any staff concern related to ES&H issues. It is up to the manager to ensure that the employee is familiar and understands the disciplinary procedures as they relate to Safety and health issues, in the interviews conducted all employees were knowledgeable to these procedures.

Notable Programs/Processes

- Communication Programs
  Let's Talk is intended for any suggestions, issues, questions, and rumors that do not fall under the scope of the staff concerns program or the Grievance Concerns process. Let's Talk is committed to providing timely responses to staff input. This is an electronic form; you may also review previous staff input and responses

- Safety Award and Recognition program
  The outstanding performance award program was designed to reward and to recognize individual staff and team excellence in helping to achieve performance aspirations of customer, organization, and financial performance. Individuals and teams can be nominated. There are 6 levels, level six being the highest award that can be achieved. Each level has specific criteria to be met. This is an excellent award program in recognizing out standing performance, leadership and cost savings.

  Employees are involved in reporting (formal and informal) of hazards, they have stop work authority, and they have input into systems and procedures for incentive programs as well as the disciplinary procedures as they relate to safety and health issues.

  The IOPS Facility Safety Committees play a direct role in developing the Safety Practices for their respective facilities. Several interviewed credited this activity as increasing employee ownership of safety at their buildings.

Conclusion

Employee ownership has taken root in many forms throughout this worksite, and it appears that it can be sustained by the infrastructure put in place by management and through diligence by all, to nurturing the culture that has been built. PNNL meets all requirements for the employee involvement tenet.

V. Worksite Analyses

The onsite review clearly showed that PNNL meets the requirements for worksite analysis found in the DOE-VPP criteria. The sub-elements of Worksite Analysis program at this site are described below.

The worksite analysis processes across the Laboratory are structured and implemented to adequately control hazards to the workers, the environment, and the public. Formal worksite analysis processes for control of operations and the mitigation of hazards or potential hazards are in place. Personnel interviewed during this review and observations made by the Team confirmed that these processes are used and understood by the workers. Hazard analysis processes incorporate such tools as the Electronic Preparation and Risk (EPR) system, Job Safety Analyses, Hazard Profile Screening Checklists, and require walkthroughs by planners, crafts, engineer/scientists, and subject matter experts to ensure a safe and functional work evolution is structured prior to work commencing.

Pre-use/Pre-startup Analysis

Pre-use/Pre-startup hazard reviews are an integral part of the S&H process at this site. All new or revised facilities, operations, and processes at PNNL are reviewed and analyzed to identify and mitigate potential hazards before work is started by the responsible Cognizant Space Manager. Proposed construction designs and modifications are subjected to safety analyses. S&H professionals review requisitions for equipment and material to identify potential hazards before they are approved. Proposed laboratory experiments undergo hazard analysis before being conducted. The SBMS provides detailed comprehensive ES&H requirements for planning, analysis and control of hazards

The Laboratory uses a formal work control procedure known as the Integrated Operations System (IOPS). Research and development work in PNNL facilities is typically performed under IOPS. IOPS establishes an operating envelope based on the hazards associated with a space and the controls in place for each hazard.

Major purchases of goods and services that require a contract are executed in accordance with the SBMS subject area, Purchasing Goods and Services. S&H issues are identified and addressed through purchasing constraints and contract provisions. Appropriate contract provisions are assured through the involvement of trained contracts specialists and a recently implemented Web Req tool (electronic purchase requisition system). Through this tool, staff can electronically create a new purchase requisition or view the status of an existing purchase requisition. The project manager or technical representative for the procurement is responsible for annotating appropriate elements of the SBMS requirements into procurement scope. Organizational field-deployed ES&H support staff are available for assistance in determining the appropriate requirements relative to the annotated item.

New and modified equipment must meet PNNL requirements for safety (e.g., guarding, electrical safety, etc.). Consensus and regulatory standards (such as the American National Standards Institute, National Electrical Code, etc.) are specified where appropriate. Although many items can be purchased without ES&H review, there is a list of items where purchase is prohibited without prior approval. Complex or safety-significant systems require a level of readiness review and/or acceptance testing specified by the Cognizant Space Manager and Building Manager. Example: Neutron Multiplier Facility decommissioning Readiness Assessment, Environmental Molecular Sciences Laboratory Readiness Assessment. The SBMS subject area, Managing Project Performance, states, "Before beginning the work, the project manager and project team members ensure that the risks and hazards are controlled (with permits, procedures, training, etc.) as specified in the approved work plans. (The determination that the risk and hazard controls are in place is accomplished using the individual project team members' organizational processes and procedures.)" SBMS provides guidance regarding the criteria that various types of equipment must meet, thresholds where overview or additional approval is required, and processes to be followed to ensure that procured equipment is properly analyzed and hazards adequately mitigated (see examples from SBMS subject areas related to the following items: pressure systems, high-power lasers, radiation-generating devices).

Comprehensive Surveys

Comprehensive facility, process-specific, safety and health assessments were conducted in the 300 Area in 1993 in response to requirements in DOE Orders. Although not updated, the documentation now serves as a valuable resource for S & H staff performing hazard assessments and analyzing potential hazards while planning work. The current PNNL mechanism for documenting identified fixed hazards in workspaces is the IOPS system. Checklists are employed to help guide cognizant space managers, ultimately responsible for the S&H conditions in the assigned space, in identifying hazards and prescribing controls. Qualified S&H professionals are available for assistance and conduct inspections of each facility, process, task, project, or experiment. These hazard identification methods are complemented by programmatic and frequent facility-specific self-assessments.

The industrial hygiene staff reported no operations require recurring exposure monitoring for airborne contaminants. The exposure sampling database included 1163 records collected in the previous 12 months. 850 of those records were beryllium swipe samples collected to characterize the facilities in accordance with DOE rules. Of the remaining approximate 300 personal exposure records, only 1 was reported to have exceeded any regulatory action level. The employee involved was protected by appropriate PPE and the hazard was ultimately eliminated.

Each Safety and Health management system performs self-assessments of the development and implementation of their system elements on a periodic cycle (e.g., every 2 to 5 years). Some self-assessments are required by law or policy to be conducted more

often: annually (Respiratory Protection, Confined Spaces, Lock N' Tag, etc.). The self-assessments of the Worker, Safety and Health, Radiological Control, and Facility Safety management systems include assessing related SBMS subject areas and program descriptions. Line and project managers are responsible for the identification of potential hazards. Those individuals have experience and qualifications related to the work, and are typically able to identify and evaluate the hazards. Qualified Safety and Health professionals are available to assist line and project managers or workers with the identification and evaluation of hazards.

Self-Assessments

Self-Assessments are used in all aspects of operations, and results are available to all employees to identify areas of concern and those needing improvement. Results are documented and tracked to ensure resolution. The assessments process is well defined in the SBMS. The SBMS subject area Conducting and Using Results from Operational Assessments requires that "Results from the assessment must be analyzed to produce information useful to improve performance and prevent recurrence of negative issues. To be effective, the information must be communicated to the manager responsible for the assessment. Using his or her best judgment, the responsible manager must report significant findings to upper management and the Laboratory Lessons Learned Coordinator, and to the Price Anderson Amendments Act (PAAA) Coordinator, as necessary." PNNL has a very strong PAAA program and are very conservative in the identification of issues. PAAA has conducted an independent overview of the program at all elements within PNNL. As S&H issues are discovered, they are documented and tracked to ensure resolution through the Corrective Actions Tracking System (CATS).

Facility Operations and Maintenance staff are required to perform biweekly self-assessments, as well as targeted self-assessments. Facility Operations and Maintenance has special formats used for self-assessments. Databases are used to track self-assessment performance and improvement actions (including the Assessment Tracking System). The ES&H Directorate planned between 8 to 12 self-assessments each reviewed year and documented its rationale for the assessments. These program-level self-assessments included the regulatory driven annual reviews of safety programs (respiratory protection program, confined spaces, etc) and other targeted areas for evaluation developed from formal and informal feedback mechanisms. The last respiratory protection program and the last ergonomic program self-assessment included Findings and Observations that were indicative of a robust, self-critical approach and process. All identified Findings from the Directorate level self-assessments are entered into the Action Tracking System.

Other Directorates developed self-assessment plans and facilities targeted bi-weekly assessments, which included independently derived safety and health targeted areas. The Independent Assessment group at PNNL performed some assessment work to validate the Directorate level and Facility level assessment work.

PNNL considers their Self-Assessment program very strong to assure quality of their overall ES&H program. The program meets or exceeds the requirements of DOE 0 420.1 and DOE P 450.5.

Routine Hazard Analysis

All work is planned and analyzed before activities begin, as described in the Pre-Use/Pre-Startup Analysis section. Research and development projects are analyzed beginning with the Electronic Prep and Risk process. During this process, product line managers and project managers evaluate the risk of proposed work in order to ensure that it can be performed safely. For Facilities Operation and Maintenance work, activities are evaluated by an assigned core team, which includes the building manager, work planners, and subject matter experts who determine whether the work requires formal planning or may be performed by skill of the craft. Lastly, all organizations perform routine self-assessments to identify and mitigate hazards that may not have been adequately addressed by work preplanning.

Hazards and routine controls in IOPS facilities are communicated by means of the Hazard Awareness Summary. Job Safety Analysis (JSA) is one of the main tools used by the site to document hazard evaluations. When routine tasks are performed, provided the safety conditions have not changed since the JSA was approved, the JSA can replace the need to complete another hazard evaluation. This allows routine activities such as routine maintenance to proceed without additional hazard analysis.

Notably, JSAs do not "authorize" the employees to start a project or task. JSAs must be used in conjunction with specific work authorizations before work is permitted to begin. Additionally, JSAs for "high hazard" activities are reviewed annually and updated as appropriate. All other JSAs are reviewed every 3 years; unless a tasks/job changes in which case they are reviewed and updated at that time. JSA's are significant part of the work control process. They are used to train workers in pre-job briefings, and employees then utilize them from the initial walk down of a task through to the post-job briefing.

Radiation Work Permits (RWP), Safe Work Permits (SWP), and Construction Work Authorizations (CWA) are additional forms of routine hazard analyses, which are used to supplement existing hazard analyses such as work orders, project hazard analyses, and other work control procedures. In addition to these work control procedures, it was noted that pre-job briefings and post-job reviews are required of all operational, maintenance, and construction activities. Besides ensuring that employees are aware of potential hazards before beginning work, this process also ensures that pertinent information is captured after the task is completed and used to improve safety and productivity.

This entire process is well integrated with the other aspects of the program. For example, as procedures and processes change, the Facility Training Review and Implementation Board (FTRIB) reviews documents such as JSAs to ensure that the appropriate training requirements are included. FTRIB members work with site area directors to ensure that work control procedures are updated and current and that all employees are adequately

trained in these procedures. Also, the Lessons Learned group reviews and collects operational experience information, prioritizes it by a risk-ranking method and places it on a site-wide database for use by trainers, managers, and others.

Employee Reporting of Hazards

Employees are encouraged and expected to identify, without fear of reprisal, conditions that compromise or are not in compliance with company safety and health programs. The SBMS subject area, Staff Concerns, describes the formal process that staff members may use to raise concerns and obtain management resolution of those concerns. Formal concerns that are submitted to the Concerns Program Office are managed according to an internal procedure. That procedure calls for the staff member to be contacted within 48 hours to further identify issues and discuss a path forward for resolution of the concern. Additionally, facility-related safety concerns are reported to the building manager either by phone or through the Service Request System, and they are addressed as part of the Facility Operation and Maintenance Work Control Procedure, as described in the Pre-use/Pre-startup Analysis section. Service Requests are tracked and managed to completion. It is company policy that managers are required to respond to employee safety concerns and provide feedback to the initiator of any report involving a safety concern. Employees are encouraged to utilize this system, however they are not required to use it as their only means of hazard reporting. Verbal notification of a manager/supervisor is specifically encouraged for those employees electing not to use the formal system. The manager in charge of the area where the hazard or potential hazard is located will then enter the appropriate information into the formal system for tracking through to resolution.

The online Let's Talk database is used for any suggestions, issues, questions, and rumors that do not fall under the scope of the Staff Concerns Program or the Grievance process. Let's Talk is committed to providing timely, quality responses to staff input. In addition to submitting suggestions, issues, questions, and rumors, staff members may view previous staff input and responses. Let's Talk strives for high quality responses within 5-working days. Documentation of past issues and their resolutions can be found in the Let's Talk Previous Staff Input. In addition, quarterly performance measures have been developed in an effort keep staff informed about how well the Let's Talk tool is performing.

Every employee that was interviewed indicted they would not hesitate to report a hazard or stop work. All indicated there was NO FEAR of reprisal. Several examples were cited where hazards were cited. One was where a passive space user stopped two Graduate students performing an unsafe act. A second example was where a driver questioned the adequacy of shipping papers for a product that was improperly transported to the location for pick-up.

Accident Investigations

PNNL investigates all off-normal events and evaluates their causes. As a result, corrective actions for adverse events are incorporated into the Laboratory's improvement

initiatives. Work-related injuries and illnesses, no matter how minor, are reported as described in the SBMS subject area, Injury or Illness. Field-deployed Safety and Health Representatives assist management with investigating and documenting staff injuries and illnesses. Those investigations are recorded in the Safety and Health Information Management System (SHIMS), which can provide a variety of reports.

Line management is responsible for accident investigations, and employees can participate either as part of the initial investigation and/or as a member of the safety team conducting required follow-up evaluation(s).

PNNL conducts a number of types of reviews, based on DOE and company requirements. Near-miss incidents are reported and investigated in accordance with the SBMS subject area, Event Reporting. Knowledgeable staff from the Laboratory facilitates investigations of significant events and ensure that root causes are properly evaluated and addressed. The Occurrence Reporting process uses a rigorous root-cause analysis on a graded approach as part of the investigation process.

Critiques are also completed as soon as practicable after an event or situation is stabilized, or after a successful special effort is completed, preferably within 24 hours. Critiques are required for all radiological events, and are recommended and conducted for nonradiological events as well. Critiques are attended by all employees involved in the event and by other employees and DOE personnel that have an interest.

Trend Analysis

Safety and Health performance and trending data are available to both management and employees, and it is used as the basis to modify, change, or establish safety processes. The data is also used to establish the overall company and unit safety goals and objectives from which employees develop their own safety and health action (tactical) plan. The Performance Analysis group prepares and distributes data covering occupational safety, industrial hygiene, radiological control, environment, deficiency and corrective actions, and prevention programs. In addition, the Occupational Medical Program issues monthly injury and illness reports covering type, severity, and lost days involved in injuries and illnesses. Notably, employee safety teams also perform unit-specific trending of injury/illness experience; inspection/assessment results, reported concerns, and root cause investigation results. The site also publishes its' Radiological Control Performance Indicator Report.

The site's Environmental, Safety and Health Performance Analysis Report is routinely published and available on-line to management and to employee members of safety committees.

Trends are conducted on the work injuries and illness, self-assessment findings and other items. However, many staff members' felt this was an area that improvement could be made.

VI. Hazard Prevention & Control:

The level and complexity of the hazard prevention and control program found at this site meets DOE-VPP criteria. Sub-elements of this tenet are addressed and described below.

Access to Certified Professionals

PNNL has a fully staffed Safety and Health Department. Professionals include Certified Safety Professionals (CSPs), Certified Industrial Hygienists (CIHs), Certified Health Physicists (CHPs), and Professional Engineer (PE) Fire Protection Engineers. Other staffs that have credentials in hazardous material management, training, transportation, and environmental compliance are also available to support the program. The site has ready access to these certified professionals for support of operations as needed. These professionals work closely with the organizations conducting operational work and tasks, and they are used in supervisory as well as in direct support staff positions. They are involved, along with employees, from beginning to end of projects and experiments. The site also has numerous other certified specialists that support operations as needed.

Communication from this extensive staff of technical experts to the employees is encouraged and supported by a number of processes and policies.

Methods of Prevention and Control

Hazards at this site are controlled using engineering controls, PPE, and work practice guidelines. These controls are reviewed and only need updating on an infrequent basis, as they are well characterized. All site safety rules, safe work practices, and PPE usage was found to meet requirements. The site has undertaken a program requiring all hazardous materials to be evaluated for suitable non-hazardous replacements, and to be centrally received so that they can be controlled, and so that Material Safety Data Sheets (MSDS) can be entered into a central computerized database for site-wide access. Hard copies of MSDS's are also maintained in the appropriate areas of chemical usage.

Tools and equipment used by workers are designed to minimize risk. For example, when cutting lead, employees use a shear vs. a saw-saw. Exhaust ventilation is used frequently. Respirators are rarely used when engineering controls can be used.

Subcontractors and employees work closely with PNNL personnel to anticipate work hazards, to reduce hazards and potential exposures, and provide precautionary protection to workers in potentially hazardous situations /conditions. All confined spaces, overhead work, and soil penetrations are screened by the contractor for the existence of potential hazards prior to the subcontractor beginning work. In many regards, PNNL requires extraordinary measures that go beyond current OSHA standards to anticipate potentially

hazardous conditions. Examples of these more stringent controls can be found in the area of fall protection, heat stress, cold stress, and ergonomics.

Engineering Controls - Engineering controls are the preferred method for eliminating/ minimizing employee exposure to hazards. Newly renovated laboratory spaces were toured where employee involvement resulted in separation of laboratory hoods, flammable storage cabinets, and autoclaves to maximize employee safety. Fugitive fumes from the cabinets were eliminated, as each is now connected to the building ventilation system. Another location had relocated the autoclaves into separate room, away from laboratory desks, as an extra margin of safety. A machine shop was toured where the employees did all the placement of the equipment. Improvements are continuing to add greater ventilation capacity.

There have also been considerable resources expended in the area of ergonomics. PNNL has three knowledgeable and trained full-time ergonomic technicians who conduct routine evaluations of workspaces and occupied areas throughout the facility. Ergonomic furniture, keyboards and other computer equipment were evident and in use in many office settings. Work areas where cases of potential ergonomic injury have occurred are evaluated, as well as the entire work section associated with the area of concern. Ergonomic training is performed to all workers for awareness to potential exposures. This training includes a computer-based training program (i.e., ERGO Buddy), which allows individuals to set up a workstation according to ergonomic requirements. Other training tools are also used. A room with ergonomically correct tools and chairs was set up by PNNL to show employees what is correct and fit them to the chair. PNNL recently completed a Self-Assessment evaluation of the Ergonomic Program and many workstations.

Administrative Controls - The type of work being conducted at this site does not warrant administrative controls that entail time rotation or other exposure control strategies. There is extensive use of personal protective equipment on the work site. A rigorous program has been developed and followed for the control of heat stress hazards, which anticipates hazardous heat conditions. The program involves utilizing the medical and industrial hygiene staffs in training workers on hazardous heat conditions, the effects and treatments of heat illness, monitoring heat stress levels using known techniques and instrumentation, implementing work/rest regimens known to reduce affects of heat, and medically monitoring workers in potential hazardous high heat level conditions. Heat illness cases have been dramatically reduced as a result this proactive initiative.

Safety and Health Rules

Rules have been clearly laid out for all employees and managers. The company employees receive positive reinforcement, as well as discipline when necessary. The SBMS delivers a comprehensive set of requirements and delivers a combination of processes and software tools that provide staff with Laboratory-wide standards, procedures, and guidelines.

SBMS subject areas, or Laboratory-wide processes, related to worker safety and health establishes the minimum set of rules for work at the Laboratory. Senior management has the responsibility to establish and enforce disciplinary policy. Violations of safety and health procedures, activities or standards can result in disciplinary action up to and including dismissal. The Laboratory has also established several programs to reward exceptional performance, including the Outstanding Performance Award Program and the Outstanding Team Performance Award Program. Most divisions and directorates have established reward programs specifically focused on ES&H performance.

Overall, the Team found that the safety and health rules to be followed by all employees, including subcontractor employees, is well documented. Interviews with employees indicated they knew and understood the disciplinary process should these rules not be adhered to. Those interviewed felt this process was both fair and consistent, and gave examples of positive reinforcement received from supervisors and management for good work practices.

Personal Protective Equipment

Site policy regarding the use of PPE is established in the SBMS. Laboratory policy states; “The use of personal protective equipment is the last line of defense against workplace hazards and is only used when engineering and administrative controls are not feasible, or as an interim measure while other controls are being implemented” as stated in the SBMS Personal Protective Clothing and Equipment program. Hazards are usually anticipated, the personal protective equipment necessary for safe completion of a job is supplied by the contractor and, where necessary, for the employees of subcontractors. A variety of equipment is made available including gloves, boots, safety glasses, hearing protection, and respirators. The application indicated that employees must receive training and appropriate medical evaluation before being permitted to use PPE and this was confirmed in the interviews with employees. Training includes information about the maintenance, care, inspection, storage, disposal and use of PPE. Where PPE is utilized, instruction for its use is integrated into task-specific procedures (JHA & JSAs). The PPE program is an in-depth program that is well integrated into the operations control, safety and health oversight, and training portions of the site’s programs. PNNL conducts a Self-Assessment of their Respiratory Protection Program annually. The evaluations include both the radiological and non-radiological programs and areas with use in the field. PNNL has a full time program administrator. Their program meets or exceeds OSHA and ANSI requirements.

Respirator certification is verified before the respirator is issued for each entry into an area requiring the respirator usage. All employees interviewed on various projects at the site indicated that they were provided all personal protective equipment specified for the job. They also indicated that the company identified the equipment necessary for each job well in advance of its use, provided training to workers on its use, and the reasons for its use. Several workers remarked that they had been so sold on the use of PPE during employment at this site, that they found themselves using PPE at home on jobs they had not previously used it on, such as grinding and lawn trimming. This information clearly confirms that a "cultural" change is occurring among the employees at this site. Very few

respirators are being used in the PNNL operations. All respirators used at PNNL are NIOSH approved.

Preventive/Predictive Maintenance

PNNL has implemented a comprehensive preventive maintenance (PM) program. PM and predictive maintenance (PdM) is used to mitigate the chances and effects of unplanned equipment failure, thereby enhancing safe and effective operations. PNNL uses a combination of preventive, predictive, and corrective maintenance to enhance the availability, operability, and reliability of plant structures, systems and components. Employees can initiate work orders for maintenance more frequently than established intervals through the Electronic Service Request (ESR) process. PM systems are computerized, facilitating scheduling, tracking and trending.

PM schedules are based on manufacturer's recommendations, plant operating experience, surveillance requirements, federal and state laws, and good engineering practices and industry codes. The equipment “owner” initiates Predictive/Preventive Maintenance as they evaluate the items and equipment on the Master Equipment List to determine which items require PM or PdM. The evaluation considers safety significance, mission objectives, and costs associated with failure. Integrated team planning and job site walk-downs are used to plan PM work orders. These teams consist of craft personnel, safety and health professionals, planners, and engineers. They identify and mitigate safety issues and develop a work document that contributes to safe, efficient work. Work packages are reviewed and approved by all cognizant, responsible personnel. Every employee has the responsibility and authority to stop any work activity, and request additional work scope and job site reviews to improve work processes or to mitigate safety and environmental risks. Management has an aggressive program to resolve these employee-generated concerns promptly. The program also includes provisions to communicate the resolution back to the employee.

Completed PM/PdM documents that have code, legal, PNNL regulatory, or other document retention requirements shall be retained in the PM/PdM Equipment History Files. Completed PM/PdM documents that have none of these retention requirements are reviewed by the Building Engineer, who identifies and determines the history information to be retained.

Each preventive maintenance action is scheduled at appropriate intervals and, as possible, combined with corrective maintenance activities on the same equipment and with other related maintenance, based on equipment similarity and proximity. The facility manager must approve preventive maintenance delays beyond the scheduled dates. Any maintenance backlog is monitored to ensure that critical and important jobs are not unnecessarily delayed and to keep the backlog to a minimum. In addition, scheduled preventive maintenance items that are backlogged show up as uncompleted in the Work Control System and are tracked until they are completed. PM associated with safety codes, hoisting and rigging, and safety basis equipment may not be extended beyond the surveillance schedule without specific management approval and justification.

Emergency Preparedness and Response

The application describes a mature emergency preparedness program. They practice scenarios (drills and exercises), have coordinated exercises with offsite agencies, and maintain a comprehensive response plan. The site has adopted the incident Command System as the model for managing emergency response on the site. The site's facilities, personnel, procedures and systems meet and/or exceed all requirements of DOE Order 151.1, Comprehensive Emergency Management System.

The Emergency Preparedness (EP) Management System is established as an SBMS subject area. The primary function of the EP Management System is to maintain the infrastructure and serve as a resource to line management for emergency preparedness activities. The emergency preparedness process is accomplished through training, continual oversight, policy and procedural development, and guidance in order to provide for the coordination and direction of planning, preparedness, and response to emergency conditions and/or off-normal events where the potential exists for personal injury, damage to facilities or equipment, release of toxic or hazardous materials, impact to projects or programs, and/or security events. Each Battelle-managed facility has an assigned Building Emergency Director (BED) and alternates, and a supporting Building Emergency Response Organization. The Building Manager of each facility is normally the BED; alternate BEDs are usually occupants of the facility. BEDs coordinate and are responsible for emergency response at the event scene direct an emergency organization consisting of individuals within the building who assist in the protection of personnel, property, and the environment based on policies, procedures, and training provided by the emergency preparedness activity use the single-point-of-contact (Control Room) to request assistance when notified of a situation that requires immediate emergency aid and make other notifications as required by procedures and/or as requested. PNNL is part of the overall Hanford Site Emergency Preparedness Program. Reviews are also conducted monthly, quarterly, and annually.

Employees interviewed were aware of emergency procedures, and effectively explained evacuation processes. PNNL has several means to communicate emergency conditions, including; alert phones, sirens, computers, intercoms, of-site radios, etc. Weather emergencies are also communicated to employees. Additionally, VPP Team members were briefed on site emergency procedures, and, although escorted during the VPP review, received orientation to site alarms, postings, and various PNNL hazards.

PNNL also operates the Hanford Site Uniform Dose Assessment Center (UDAC) for DOE. PNNL conducts their own monthly drills and is involved in a joint drill with DOE and other onsite contractors. These drills are to ensure developed/deployed emergency and evacuation plans, as well as contingency plans function properly. A recent drill was conducted of 325 Building in May 2001 and proved to be beneficial. During the recent CY 2000 Range fire PNNL was the Event (Lead) Contractor.

Radiation Protection Program

The site has implemented the As-Low-As Reasonably-Achievable (ALARA) program to maintain the highest standards of environmental, safety and health protection possible. The ALARA program has allowed the site to achieve and maintain exposure levels far below the applicable controlling limits of 10 CFR 835, Occupational Radiation Protection. The program ensures that all employees with potential for exposure are adequately trained and can demonstrate an understanding of the programs. Program documents are thorough and comprehensive. Program data and trends are monitored to ensure adequate performance.

Much of PNNL contribution to DOE in the area of Radiation Protection is considered the best in the nation, if not the world. PNNL is a leader in this area. The PNNL Radiation Protection Program is well laid out, staffed by an excellent group of people, and more than meets the criteria of "protecting the workers and the public, and the environment."

Medical Programs

The site and PNNL has integrated medical services with ES&H. Personnel are served by the DOE contract with the Hanford Environmental Health Foundation (HEHF) for performance of the annual medical surveillance, audiometric exams, and pulmonary function testing. In addition to the DOE Contracted services, PNNL has contracted medical services, first aid, and case management of return to work of employees HEHF. There are three (3) satellite dispensaries and two (2) major clinics at this site. One major clinic is located in North Richland. Four (4) physicians, in addition to the medical director, provide the necessary medical evaluations supported by the rest of the medical staff. Medical staff is involved in hazard analysis, early recognition, and treatment. Walk-around observations often include medical staff so that they can get a first hand understanding of work place exposures.

As an example, medical programs include:

- Hearing Conservation
- Asbestos
- Ergonomics
- Lead Respiratory
- Strains/Sprains
- HAZWOPER
- Beryllium
- Wellness

PNNL utilizes the Employee Job Task Analysis (EJTA) system. This Hanford-wide system is used to match work related hazards that require medical evaluation and essential job functions. Medical exams are then scheduled with notification to the employee and their supervisor. The Team found these combined systems to be unique, and extremely efficient.

Emergency transportation is provided by the Hanford Fire Department (HFD), which is managed by Fluor Hanford. Multiple paramedics around the clock for full advanced cardiac life support ambulance service, as well as a full battalion force fire department for fire response, industrial rescue, and haz/mat/rad response staff the HFD. Medical protocols are based on the county medical protocols system, and approved by contract with an emergency medical director.

As part of the Medical Program, a monitoring and industrial exposure potential program has been developed for entire Hanford Site, including PNNL. This program is called the Employee Job Task Analysis (EJTA). The overall goal of this program is the successful identification of employees work process; exposure potential, and medical review(s) needs are identified. HEHF provides this service for all Hanford contractors and sub-contractors for their employees. The EJTA requires an annual review between the supervisor and the employee. This review includes site visitors; contract employees that are identified to require an EJTA. PNNL has conducted and is current on greater than 98% of their identified workforce.

Notable: This site has developed and implemented a unique computerized paperless medical record retrieval system that provides instant access to patient information in a client server environment. The Industrial Hygiene database is integrated with this system to give notification of overexposures encountered. Also, validation of medical services occurs electronically to guarantee appropriate enrollment of individuals into surveillance programs.

VII. SAFETY AND HEALTH TRAINING

The safety and health training program, procedures and overall implementation meets the DOE-VPP criteria.

Safety and Health Training

Overall, the site provides formal, comprehensive, and documented safety and health training for all employees, supervisors and managers. The Standards-Based Management System subject area, Training and Qualification for Staff, describes training and qualification considerations for PNNL staff members and onsite non-staff. The subject area establishes required procedures and suggested guidelines for identifying, planning, and completing training. It is intended to include all training considered to have an affect on the performance of work that presents a possible risk or consequence to PNNL staff, facilities, or business. The immediate manager, training coordinator, and/or staff member identifies the staff member's training and qualification needs by:

- Developing a training plan using the Staff Development and Training Planning (SDTP) Tool within 30 days of hiring, and at least annually thereafter. Efforts are underway to upgrade the STDP tool to a program titled “Job Evaluation Training System (JETS).

- Assigning any additional training and qualification activities when needed to address local, organizational, project-, or job-specific needs. These training and qualification assignments are made whenever needed to support work.

Two levels of hazard training were available. First is for passive user, those who may be in the proximity, but not work with the hazard. The second is for the active user, those who are directly exposed to the hazard. A passive user may need access to a laboratory to monitor equipment, while the active user may be in the same room, but be performing work within a hood. Most hazards-related training courses provide information about how to recognize hazards as well as mitigate them. Lesson plans are available for each course, and a rigorous process of development, approval, periodic review, and student evaluation ensures a high level of quality and continuous improvement in the training process.

Computer-based training provides many courses, although testing and practical examination to demonstrate proficiency is used when appropriate or required. Classroom training is made available as an alternative to many online courses for those staff that do not feel comfortable using the computer.

Informal training methods used at the site include safety meetings, informal "tailgate" or "toolbox" sessions, and oral briefings by supervisors or managers. Other informal

methods include various publications such as pamphlets, fliers, memos and alerts that are available in both hardcopy and in electronic format.

Overall, it was apparent during this review that sufficient safety and health related knowledge, skills, and abilities are evident in the workforce. PNNL has a comprehensive method for ensuring that necessary training is identified for each employee in a Job Requirements Review, and that required training is reflected in Employee Training Plans. All employees interviewed indicated that they understood the training requirements related to their jobs, and indicated that if they felt identified requirements were not applicable, that they had a mechanism within the company to challenge the requirement.

The computerization of facility specific training has allowed greater flexibility for new staff or visiting scientist to start work. It was noted that the training can be made available over the internet so the training can be completed prior arrival. This allows quick resolution of any questions at the beginning of their work activity.

Examples were cited where the IOPS training function helped eliminate 10-15% of those scheduled for Radiation Worker and HAZWPR classes.

VIII. General Assessment

Safety and Health Conditions

The DOE-VPP Onsite Review Teams made observations during walk-around activities, both as a group and individually, and conducted over one hundred interviews of PNNL personnel. No conditions or events, which could be qualified as significant in terms of an unabated hazard to workers, were noted or reported. It was readily apparent that hazard prevention and control measures were effectively implemented at the site. Site safety rules, safe work practices, and PPE usage met requirements although team members did observe one or two conditions and events which were in apparent violation of OSHA codes, or were not in keeping with best practices. These conditions were reported to PNNL management and their response included evidence that deserving issues, with/ without mitigating circumstances, would receive management attention. For example, in one instance, two workers were observed using compressed air to clean machine surfaces. They wore prescription safety glasses, but not side-shields, for protection against flying metal fines. PNNL management had previously identified the hazard and issued side-shields to the workers, but their use was discontinued by workers and not reinforced by management. The VPP team notified management and their response included a key commitment to enhance worker buy-in. In another instance, an authorized worker lock and tag was found on equipment to control a hazard. The worker was not in the act of servicing the equipment, and hence the use of an authorized worker lock was in contradiction with OSHA requirements. The mitigating circumstance was that the worker had placed the lock in order to prevent other workers from inadvertently being exposed to a hazard. The practice may have been repeated elsewhere, and PNNL management recognized the need to reexamine the practice.

The consensus of the team was that the site was well maintained and no major S&H issues were observed. All minor issues were immediately explained and/or resolved to the satisfaction of the Team.

Safety and Health Programs

The DOE-VPP team found the applicant's program to be highly effective. The overall program is comprehensive and well communicated. The Team believes that the contractor has developed a strong S&H infrastructure, and with proper guidance and funding, this program is expected to continually improve.

IX. Team Conclusion

The Team was able to reach a consensus opinion that the applicant has met or exceeded all technical requirements for participation in the DOE-VPP. Accordingly, the Team now forwards this report as formal documentation of their conclusion to senior management for their consideration in granting DOE-VPP recognition to PNNL.

X. References*

- Pacific Northwest National Laboratory Environmental Management Performance Report, Office of Environmental Management, May 2001
- PNNL Voluntary Protection Program Application, October 1, 2000
- PNNL Voluntary Protection Program Application Evaluation Review, May 4, 2001
- PNNL VPP Onsite Review, Tuesday, May22 – May 24, 2001 (Smart Book)
- PNNL DOE-VPP Program Evaluation, FY 2001, March 2001
- PNNL DOE-VPP Program Evaluation, FY 2000, October 2000
- FY 2001 Annual Voluntary Protection Program Evaluation (ATS # 3442)
- PNNL Organizational Charts, May 2001
- PNNL FY 2001 Performance Goals, Director, Facilities & Operations
- PNNL Staff (Exempt/Non-Exempt/Bargaining), May 2001
- Environmental Technology Division Performance Management System Description
- Environmental Technology Division (ETD), Associate Lab. Director 2001Goals
- ETD Facility Requirements – Radiological Control Self-Assessment Checklist
- Personnel 2000 Performance Review (six examples)
- Customer Service Model
- Strategic Planning: Process
- ES&H Directorate Strategic Plan, FY 2000 through FY2003
- ES&H Directorate Self Assessment Plan, FY 2000 & FY 2001
- NUMBER OF IH SAMPLES FROM MAY 1, 2000 THROUGH MAY 23, 2001 (ONE PERSONS)
- PNNL assessment Tracking System
- Self Assessment Checklist: Areas of Improvement
- FY 2000/FY 2001 Self-Assessment Schedule Radiological Control/Worker Safety Health Management System
- MOMORANDUM OF UNDERSTANDING FY 2001 PERFORMANCE EVALUATION PLAN FOR THE WORKER SAFETY & HEALTH MANAGEMENT SYSTEM
- Worker Safety & Health Management System Business Plan
- PNNL STAFF AND NON-PNNL STAFF TRAINING RESPONSIBILITY MATRIX
- CORRECTIVE ACTIONS CHECKLIST
- Resolution of Dissenting Technical Opinions
- Office Safety Self Assessment Evaluation Form
- Action Plan to Address PNNL DOE-VPP Program Evaluation, issue 1
- VPP Corrective Action Plan – Issue 1
- Work Completion Closeout Checklist
- BI – Weekly Assessment Report
- PNNL Chemical Process Permit
- PSL Practice Chemical Storage
- Memorandum of Understanding and Readiness Assessment Plan for the Neutron Multiplier Facility Deactivation Project

- ES&H Walk-Through Corrective Action

* The following documents were reviewed as a source of background information and comparative data during the Application Evaluation Review of the PNNL. Submittal for the DOE-VPP. This section is entitled "References," to guide those readers who wish to consult the documents that were reviewed by the Office of Regulatory Liaison, EH-51, along with the subject application. Although this list has been placed in a bibliographic format, it is not intended to imply that these documents are cited within the body of this report.

XI. Appendix: DOE-VPP Onsite Review Team

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